Name of the college: Government College of Arts , Science & Commerce, Sanquelim, Goa. Name of Faculty: Rohit R. Redkar Subject: Advanced Graph Theory Paper code: MAT-605 Program: M.Sc. Division: Academic year: 2024-25 Semester: IV Total Lectures: 60 Course Objectives: 1. Give a deeper insight into basic concepts in Graph Theory, so as to be able to embark into research in the field.		Lecture Plan						
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Expected Course Outcomer								
1 Understand the concepts required to pursue research in Graph Theory				sue research in Graph Theory	erstand the concepts required to pursue res	Expected Col		
2. Learn labelling of graphs and properties.					habelling of graphs and properties.	2.		
3. Learn coloring of graphs.								
4. Learn about domination of graphs.								
Student Learning Outcome:					Dutcome:	Student Lear		
1. Learn labelling of graphs and properties.					a coloring of graphs	1.		
3. Learn about domination of graphs								

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignme nt	ICT Tools	Reference books
December	Week 1 04/12/24	07/12/24	04	Review of Basic Concepts: Graphs, Trees, minimal spanning trees, connectivity and edge-connectivity, Eulerian graphs, Hamiltonian graphs, Euler's formula, Planar graphs, Colourings, Matchings, Independence and Domination in a graph.		Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
December	Week 2 09/12/24	14/12/24	04	Independent Sets, Matchings & Covers, Maximum Matchings		Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
December	Week 3 16/12/24	21/12/24	02 Liberation Day	Matchings in bipartite Graphs		Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
January	Week 4 02/01/25	04/01/25	02	Hall's Matching Condition, Min-Max Theorems		Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition

January	Week 5 06/01/25	11/01/25	04	Perfect Matching, Factorizations and Decompositions.		Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
January	Week 6 13/01/25	18/01/25	04	Graceful Labeling		Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
January	Week 7 20/01/25	25/01/25	04	Graceful Labeling	ISA	Smart Board, Beamer Presentation	G. Chartrand and L. Lesniak, Graphs and Digraphs, Chapman & Hall/CRC, Third edition
January-February	Week 8 27/01/25	01/02/25	04	Harmonious Labeling		Smart Board, Beamer Presentation	G. Chartrand and L. Lesniak, Graphs and Digraphs, Chapman & Hall/CRC, Third edition
February	Week 9 03/02/25	08/02/25	04	Bandwidth Labeling		Smart Board, Beamer Presentation	G. Chartrand and L. Lesniak, Graphs and Digraphs, Chapman & Hall/CRC, Third edition
February	Week 10 10/02/25	15/02/25	04	k-Connected Graphs, Menger's Theorem.	ISA	Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
February	Week 11		04	k-Edge Connected Graphs		Smart Board,	Gary Chartrand, Linda Lesniak, Ping Zhang,

	17/02/25	22/02/25				Beamer Presentation	Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
February-March	Week 12 24/02/25	01/03/25	04	Dominating Queens, Dominating Sets in Graphs, Applications of Dominating Sets		Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
March	Week 13 03/03/25	08/03/25	04	Bounds on the Domination Number (in terms of order, in terms of order and size).	ISA	Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
March	Week 14 10/03/25	15/03/25	04 Holi	Chromatic Number and Chromatic index, Brook's Theorem, Vizing's Theorem		Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
March	Week 15 17/03/25	22/03/25	04	Chromatic Polynomials.		Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
March	Week 16 24/03/25	29/03/25	04	Cliques, Ramsey Number	ISA	Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition
March-April	Week 17 31/03/25	05/04/25	02 Gudi Padva, Id	Extremal graph theory and Turan's Theorem		Smart Board, Beamer Presentation	Gary Chartrand, Linda Lesniak, Ping Zhang, Graphs and Digraphs, Chapman & Hall/CRC, Sixth edition

* Assessment Rubrics

Component	Max Marks
ISA 1	20
ISA 2	20
ISA 3	20
Practical	Nil
Project	Nil
Semester End	
Exam	40